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ABSTRACT

The need to modernize deteriorating and obsolete research facilities at universities and colleges is of widespread concern to the academic research community and to government agencies and other organizations which support that community. On July 22-23, 1985, some 200 leading college and university administrators, researchers, industrial and government officials, and representatives of scientific and professional societies gathered at the National Academy of Sciences in Washington, D.C., to discuss the issue. Their principal purpose was to identify and consider a spectrum of approaches that could help address the need at a time of tight constraints on the Federal budget. The conference was not designed to adopt consensus-based recommendations. The participants were searching for a comprehensive set of approaches that would meet facilities' needs on a continuing, long-term basis; recognize the diversity among research institutions and disciplines; and allow for the establishment of new research capabilities as well as the maintenance of existing strengths. This report summarizes those approaches and presents them as action items addressed to the Federal Government, to state governments, and to academic institutions. The conference agenda and the list of Planning Group members are also included. (Author/CW)

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# Academic Research Facilities: Financing Strategies

## Executive Summary

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SE 049 734

# Academic Research Facilities: Financing Strategies

Report of a Conference July 22-23, 1985

## Executive Summary

NATIONAL SCIENCE BOARD

OFFICE OF SCIENCE & TECHNOLOGY POLICY

GOVERNMENT-UNIVERSITY-INDUSTRY RESEARCH ROUNDTABLE

National Academy Press Washington, D.C. 1986

The Office of Science and Technology Policy is the White House office that serves as a source of scientific and technological analysis and judgment for the President with respect to policies, plans, and programs of the Federal Government. The Director of the Office also serves as the President's Science Advisor with responsibility for, among other things, evaluating the nation's science and technology effort and providing advice on the scientific and technological aspects of national security, economic, health, energy, and environmental matters.

The National Science Board is the governing body of the National Science Foundation. The Board is composed of 24 members appointed by the President for six-year terms, and the Director of the Foundation. Members are selected for their distinguished service in science, engineering, education, industry, research management, public affairs, medicine, and agriculture; they represent all areas of the nation. The principal role of the Board is to establish policies for the Foundation to fulfill its various statutory missions and oversee its operations. The Board also assists in the formulation of national science policies.

The Government-University-Industry Research Roundtable is a forum for scientists, engineers, administrators, and policymakers from all sectors to explore ways of improving the productivity of the nation's research enterprise. The objectives are to understand issues, to inject imaginative thought into the system, and to provide a setting for discussion and the seeking of common ground. The Roundtable develops options and brings all interested parties together; it does not make recommendations nor offer specific advice. The Roundtable is sponsored by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

This report has been prepared in two versions. Additional copies of the Executive Summary and copies of the entire report are available at no charge from:

Government-University-Industry Research Roundtable
National Academy of Sciences (JH 308)
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

## PREFACE

America's economic and defense strength depend in large part on the excellence of its academic institutions as sources of trained scientists and engineers and new ideas in science and engineering. That excellence is threatened today by the growing obsolescence of academic facilities and equipment for research and education. National research leaders and administrators are convinced that the problem requires action soon if the United States is to remain a world leader in an age of rapid technological change and intensifying competition. Estimates of the total funds needed to modernize academic science and engineering facilities vary, but all are in the billions. The scale of the equipment problem is comparable.

These problems confront us at a time of financial constraints brought about by recognition of the need to curb budget deficits. So the problems of modernizing academic facilities and equipment cannot be addressed simply by additional dollars. They will also require the reallocation of present funding within the nation's total R&D budget and within its universities and colleges, along with the more efficient use of funds.

Many possible actions to meet these problems emerged from the conference described in this report. No single solution will be sufficient. Many of them, especially those involving reallocation, will be painful. But as conference sponsors, we are convinced that action now is necessary if the nation is to avoid the greater pain that would result from sacrifice of one of our greatest strengths: leadership in science and engineering.

John McTague
Acting Director
Office of Science and
Technology Policy

Roland Schmitt
Chairman
National Science Board

Dale Corson
Chairman
Government-University-Industry
Research Roundtable

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## PART I: EXECUTIVE SUMMARY

### Introduction

The need to modernize deteriorating and obsolete research facilities at universities and colleges is of widespread concern to the academic research community and to the government agencies and other organizations which support that community. On July 22-23, 1985, some 200 leading college and university administrators, researchers, industrial and government officials, and representatives of scientific and professional societies gathered at the National Academy of Sciences in Washington, D.C. to discuss the issue. Their principal purpose was to surface and consider a spectrum of approaches that could help address the need at a time of tight constraints on the Federal budget.

The idea for the conference originated in a resolution by the National Science Board, which was joined in sponsoring it by the President's Office of Science and Technology Policy, the National Academies of Science and of Engineering, and the Government-University-Industry Research Roundtable.

Research facilities at our nation's universities and colleges are infrastructure investments with regional and national importance for economic development, industrial competitiveness, national security, and the health and well being of our citizens. But in many research fields, further progress at the leading edge requires new, more productive, and more capital-intensive facilities. Academic institutions and funding agencies have not kept up with facility funding needs for at least the last decade. The problem is exacerbated by the serious fiscal constraints now being faced by Federal agencies; solutions will not be possible through the use of Federal funds alone.

Estimates of the extent of the unmet nationwide need for new construction and renovation vary in the range of $5 to $20 billion in the next 10 to 20 years. No matter what the precise estimate, American research efforts are lagging far behind potential opportunities and are certain to suffer in the future if steps are not taken soon to refurbish existing facilities and build new ones. Accordingly, the conference focussed on developing approaches to the issue rather than attempting once again to estimate its extent.

Efforts by a few academic institutions to obtain facility funding by direct appeal to the Congress are symptomatic of the depth of the facilities modernization problem; such efforts also raise questions about the proper locus and criteria for making decisions about proposed facilities.

Six working groups were organized to consider various aspects of the topic. Each met to discuss draft papers prepared in advance by group leaders and conference staff. The working groups then reported their findings and suggestions to the full conference for further consideration. In addition, a panel discussion was presented concerning the processes used to select facility proposals for Federal funding. The proceedings concluded with statements by representatives of the sponsoring organizations.

The conference was not designed to adopt consensus-based recommendations. The participants were searching for a comprehensive set of approaches that would meet facilities needs on a continuing, long-term basis; recognize the diversity among research institutions and disciplines; and allow for the establishment of new research capabilities as well as the maintenance of existing strengths.

Part I of this report summarizes those approaches and presents them as action items addressed to the Federal Government, to state governments, and to academic institutions. (Although there is no separate section addressed to industry, individual firms and industrial consortia are expected to be essential partners in implementing many of the action items.) The conference agenda and the list of Planning Group members are also included in Part I.

Part II contains the opening statement by Roland Schmitt, reports of working group chairs, statements by convenors and panelists, and a summary of the plenary discussions. Part III contains several key documents referenced in the other parts and the list of conference participants.

The conference was chaired by Dale Corson of the Research Roundtable. It was planned by a group headed by John H. Moore, Deputy Director of the National Science Foundation. Staff support was provided by Don Phillips and Anne Scanley of the Research Roundtable. This report was prepared by Jim McCullough and Pat Dennis of the NSF staff under the direction of John H. Moore.

## Actions for the Federal Government

Seven of the major topics discussed at the conference are potential action items for the Congress and Federal agencies. The first three would take differing approaches to facilities funding -- acceleration of indirect cost recovery; provision of credit support through loans, guarantees, and similar mechanisms; and direct Federal funding of a national facility program.

As conference participants pointed out, the facilities modernization issue is only one of several problems affecting the vitality of the nation's scientific and engineering enterprise. Furthermore, current efforts to reduce the Federal budget deficit severely limit the prospect for major new Federal funding initiatives.

F-1: The use allowance for facilities under OMB Circular A-21 should be increased from the present two percent to five percent.

Background: One component of indirect costs chargeable to the Federal Government in R&D grants and contracts with academic institutions is a use allowance for research buildings. The standard allowance is 2 percent per year. Alternatively, institutions may apply a specific depreciation rate if fully documented and agreed to by the auditing authority responsible for the institution (usually the Department of Health and Human Services or the Defense Contract Audit Agency). Interest on certain loans taken by an institution to construct a building may also be included, with the permission of the sponsoring agency.

Applying a more realistic standard use allowance of 5 percent would in effect redefine the useful life of a research facility from 50 years to 20 years. Because indirect cost recovery is linked to specific grants and contracts, facility support provided in this manner depends on the amount of funds an institution receives from competitively awarded proposals.

Comment: Participants viewed the principal advantages of this approach as: (1) linkage of support for particular facilities with individual research projects that, in most cases, have passed the test of peer review; and (2) faster rate of recovery of institutional funds used to maintain facilities and to repay loans used for construction or renovation.

The principal disadvantages discussed were that the payback period remains long, and that this approach would not directly meet the short-term needs of institutions seeking to establish new research capacity or those that currently have a small base of Federal R&D funding. Increased facility cost recovery would come at the expense of other direct and indirect costs (i.e., less research could be supported), unless the total of Federal research funds is raised sufficiently or reallocated within existing national R&D funding. For public institutions there is the additional complexity of varying treatment of recovered costs by state governments.

In the interest of a long-term solution to keep facilities up-to-date, institutions that have not already done so are urged to establish a special capital reserve fund to "capture" and invest the use allowances recovered in this fashion.

In addition, raising the use allowance will better enable institutions to repay loans, as proposed in the next action item.

Note: In December 1985, the White House Science Council's Panel on the Health of U.S. Universities and Colleges released its draft report. One of the Council's recommendations was that the basis for use allowances be reduced to 20 years. The report notes that doing so will "inject reality into the costs of doing research," although it "will increase substantially the indirect fraction of total costs."

F-2: An independent nonprofit corporation should be established to finance academic research facilities.

Background: Of the more than 3,000 institutions of higher education, only about 300 have effective access to the existing tax-exempt bond market. The remainder lack credibility with private lenders, who are not easily able to assess the risks of lending to academic institutions. Most of these institutions are financially viable and capable of servicing moderate debt, but they need a mechanism to provide guarantees of their financial performance to private lenders.

A conference participant (David Clapp of Goldman, Sachs and Company) proposed the creation of an independent, nonprofit

corporation to provide low-rate loans, loan guarantees, and other financial assistance for research and educational facilities. The corporation would be established with a one-time, $500 million appropriation; funds could be added from private sources. The corporation would issue its own bonds, using the initial capital as backing, and use the funds obtained to make loans to colleges and universities for construction or renovation. Income from investing the initial capital would be used to defray administrative costs and to subsidize interest costs for the facilities loans. The proposal can be found in Part III of this report.

Comment: Participants viewed as a major advantage the provision of funds prior to construction or renovation. In issuing its own bonds and lending the proceeds to qualifying institutions, the corporation would diversify risk and thus provide the possibility of lower interest rates. The bundling of numerous loans into single debt instrument issues would produce administrative cost savings. Perhaps most importantly, the corporation would afford access to tax-free bond markets to institutions that would not otherwise enjoy such access.

With its own capital base established by initial Federal funding and possibly funds from other sources, the corporation would be a permanent, independent entity. Through the interest payments made by its debtors, it would represent a long-term source of capital for research facilities.

The corporation's evaluation of proposals for facilities loans would necessarily involve review of a business plan as well as review for scientific merit. To the extent that use charges or depreciation are used to pay back loans, this option is coupled with the first approach.

Note: Subsequent to the conference, the House passed a proposal for a facility loan guarantee corporation. Title VII of H.R. 3700, the Higher Education Act Amendments of 1985, as adopted in December 1985, authorizes a private, for-profit entity known as the College Construction Loan Insurance Corporation (CCLIC). It would be organized through the Departments of Education and Treasury and the Student Loan Marketing Association. The CCLIC would issue stock and use the proceeds to guarantee and insure bonds, loans, leases, and other debt instruments for any

"educational facilities purpose." Qualified purposes include not only construction or renovation of facilities for education, training, or research but also acquisition of research instrumentation and instructional equipment. The relevant portion of H.R. 3700 can be found in Part III.

The effectiveness of the Student Loan Marketing Association (SLMA) would be an indispensable asset in undertaking the new corporation. SLMA has a remarkable record of generating private investment in support of student aid. Since it was established in 1972 it has attracted private capital in excess of $650 million, and supports some $14 billion in loans to students. In doing so, SLMA has maintained a very strong financial condition, and has the credibility in the private marketplace that is essential to its success.

F-3: The concept embodied in H.R. 2823, a bill to authorize increased Federal support for construction and renovation of academic research facilities, should be supported. Funds should not be provided on a set-aside basis, however, but should supplement existing research funds.

Background: H.R. 2823, the "University Research Facilities Revitalization Act of 1985," was introduced on June 20, 1985, by Representative Don Fuqua (D-FL), Chairman of the House Committee on Science and Technology. The bill would authorize the six agencies that expend 84 percent of Federal research and development funds (NSF, DoD, DoE, HHS, USDA, NASA) to establish programs for modernizing college and university laboratories. A total of $470 million in "start-up funds" would be authorized for the first year (fiscal 1987); in succeeding years through fiscal 1996, the six agencies would be required to spend at least 10 percent of their academic R&D funding for the purposes of the bill. At least 15 percent of the amounts reserved for the program would be allocated to institutions below the top 100 in Federal R&D funding. Any Federal award could not exceed half the cost of the proposed construction or renovation, with remaining funds from institutional or other non-Federal sources.

On introducing the bill and again at the conference, Mr. Fuqua characterized it as a point of departure and a vehicle to develop consensus among the academic community, the Federal agencies and the Congress. The bill and the statement that accompanied its introduction can be found in Part III of this report.

Comment: Enactment of such legislation was supported by many participants who believe that clarification of agency authority to support facility renovation and construction is necessary, and that it would help stem the flow of direct appeals by individual institutions to Congress for specific facility appropriations. The legislation was also seen as an effective means of leveraging additional funds from the states, industry, and academic institutions.

The principal concern of some participants was that a set-aside provision could result in funds being diverted from support for research projects and programs. Some participants, however, felt that such a trade-off would be appropriate.

The set-aside provision was also criticized on the grounds that it could force the Federal agencies to approach facilities support in the same manner, whereas needs vary by discipline, program, and institution. (Note that the bill addresses this concern by permitting the head of each agency to issue regulations prescribing the terms and conditions of its program.)

Many participants felt that the matching requirement is a strong feature of the bill, and they appealed for flexibility in the ways such a requirement could be fulfilled. The concept of funding facilities through block grants to states or regions (not a feature of the bill) was strongly rejected.

The next item in this section concerns the process for making decisions about federally funded facilities:

F-4: A comprehensive review of the criteria used to make facilities funding decisions in the past should be carried out, to provide a firm foundation for recommendations about future facilities decision mechanisms.

Background: One of the working groups addressed the idea of "comprehensive merit review" of facilities proposals, to include considerations beyond those of the traditional peer review -- especially a more explicit recognition of the economic, social, and environmental effects of particular decisions. More information on the proposal may be found in the report of Working Group Six in Part II of this report.

Comment: Conference participants discussed this idea at length but were far from reaching consensus, with substantially differing points of view regarding the feasibility and value of this approach.

Proponents believe that the Federal interest in a national facilities modernization program requires taking factors other than scientific merit into account -- including broadening the base of research institutions and developing research potential throughout the nation. Accommodating explicit social and political factors may require more extensive participation in the review process by nondisciplinary specialists.

Opponents state that the concept of "comprehensive merit review" is dangerously confusing since no boundary conditions are defined; a decision to fund a particular facility at a particular location, therefore, could respond to any number of imprecise considerations, with decision factors that are unweighted and open-ended. This would lead to undisciplined competition, more overt politicization of the university research enterprise, and the risk that any national policy to invest in facilities would collapse.

The difficulties and complexity of this issue were acknowledged by all parties.

The next two items deal with changes in tax incentives for industrial and other private sector support for modernization of academic research facilities.

F-5: Proposals for tax reform should be monitored to evaluate their effects on facilities funding.

Background: The conditions for issuing tax-exempt bonds for facilities construction (and other purposes) are governed by Federal tax law. Many participants were quite concerned that pending amendments could serve to limit or foreclose the use of this means to modernize the research infrastructure.

Comment: Since the conference the House has approved H.R. 3838, the Tax Reform Act of 1985, which includes provisions that would severely limit the issuance of tax-exempt bonds by private educational institutions and which could, depending on the eventual interpretation, have the same effect on state institutions.

F-6: The tax credit now available for research equipment donations should be extended to similar donations for academic research facilities. Generally, thought should be given to new tax inducements for facilities supported by the private sector.

Background: The Economic Recovery Tax Act (ERTA) of 1981 allows research equipment manufacturers that donate equipment to universities to take a tax deduction amounting to the cost of producing the equipment, plus half the difference between production cost and fair market value. Among other conditions, the Act excludes donations for educational equipment (as distinguished from research training equipment) and excludes equipment to be used for social and behavioral research.

Comment: The tax reform legislation mentioned above purposefully did not expand the existing equipment donation provisions to cover educational use, social and behavioral research, or contributions of software. The concept of extending it to cover facilities modernization was not proposed.

The final item addressed to the Federal Government calls for additional information on the nature, size, and scope of the facilities modernization issue:

F-7: A careful study emphasizing the collection of better data on the state of academic research facilities should be undertaken.

Background: As mentioned in the introduction, estimates of the precise magnitude and extent of facilities modernization needs vary due to differences in definitions, sampling techniques, and time periods used. The conferees saw a need for a continuing, authoritative source of data collection and analysis of this issue.

Since the conference, the Congress has directed the Foundation to develop systematic information on facilities needs and report the results. The pilot survey is being conducted under the auspices of NSF's Science Resources Studies (SRS) Division, and a report will be forwarded in September 1986. SRS intends to conduct such surveys on a biennial basis.

## Actions for State Governments

Research facilities contribute to a state government's objectives as well as national needs; thus, direct and indirect state funding for facilities, as well as partnership arrangements involving Federal and state governments (and industry), are appropriate.

S-1: State governments should develop comprehensive plans for academic research facilities on the basis of their views of the state's economic future, industrial profile, and labor force needs.

Background: A number of states have recognized the importance of their research and educational infrastructure to the long-term economic well being of their citizens, and have made investments that reflect this recognition. These investments are not confined to research facilities, but their programs demonstrate the ever-increasing degree to which state governments understand and are willing to deal with facility modernization issues.

A few examples:

- Washington State approved a $10.6 million High Technology Education and Training Act to support state colleges and universities in developing cooperative high-technology programs. This legislation includes funds to build a center at the University of Washington focusing on bioengineering, microelectronics, and materials science.

- The Arizona legislature appropriated $19.5 million for a new Center for Excellence in Engineering at Arizona State University; the associated 120,000 square foot structure, with the latest in technological research equipment, has already been completed.

- New Jersey has marketed a bond issue to support research facility construction. Local research centers specializing in critical engineering topics are being created; these are outgrowths of centers initiated earlier under the National Science Foundation's program of Industry-University Cooperative Research.

- New York, Michigan, and other states are establishing networks linking computer installations at academic institutions and other sites; these represent important potential components of a future national network.

- Tennessee has made a major commitment to its university system, in both instruction and research. Their program, announced in mid-1985, includes a $20 million/year commitment to build centers of research excellence in various state colleges and universities; $20 million for endowing chairs in research and teaching; and $10 million for instrumentation and equipment.

Comment: These are only a few outstanding examples of programs recently underway at the state level. The list could easily be extended; many states, among them California and Massachusetts, have long been involved in efforts to build research capacity. The conference participants emphasized the importance of state actions.

S-2: In developing their plans, states should consider a wide range of sources and techniques for funding academic research facilities.

Techniques include general funding, leveraging of private funds, bonding and other debt financing, lease-purchase arrangements, dedication of tuition payments to facilities, user fees and rents, and methods of managing indirect cost recovery funds.

State funding has been influential in generating industry support and commitment for research. Michigan has committed more than $21 million to establish a $100 million Industrial Technology Institute; the state is also providing $6 million for a Molecular Biology Institute at Michigan State University. Missouri provides 50 percent matching funds up to $950,000 for basic research projects, and 100 percent matching up to $475,000 for applied research projects. The West Virginia legislature has authorized up to $800,000 a year in matching funds for industry-sponsored research.

Bonding authorization from state legislatures is an attractive alternative to general fund capital appropriations. One-third of all state and local capital investments are financed through the issuance of tax-exempt bonds. With proper justification for requested projects and realistic funding for the necessary debt service, additional bonding authority appears to offer a good chance for new facility funding.

Earmarked taxes could provide a steady revenue source to continually construct, maintain, and renovate facilities. Traditional sources of revenue -- sales and income taxes -- are already heavily earmarked for counties, municipalities, and public education. Portions of new or additional taxes (e.g., severance taxes or taxes on liquor or cigarettes) could be earmarked for facilities.

State institutions should consider lease-purchase arrangements for the development of new facilities. The University of Arizona, for instance, acquired an Optical Sciences building through a lease-purchase agreement executed in 1969. The project was handled through the university's foundation, which borrowed from local lenders willing to provide funds because the university had a favorable long-term contract with a Federal agency guaranteeing payments. The lease-purchase method could be used to fund more facility construction if state operating funds were used for lease payments. This option would mean, however, that the burden would be largely placed on appropriated dollars to support this approach.

Tuition charges could be used for direct investments in capital projects or as a source of funds to service debt. This option may be difficult to implement under pressures to hold down tuition; state institutions are under particular pressure to keep tuition low to ensure that higher education is available to all.

## Actions for Academic Institutions

In the course of the discussions, some participants commented on the planning and management practices of colleges and universities. The comments can be generalized as follows:

I-1: Institutions should improve their facility design, construction, and space management practices to reduce costs, to incorporate the best current practice, and to achieve better use of existing and potential facilities.

Comment: The economic situation, organizational structure, and management approach of each college and university differs. The traditional ethos of decentralized organization and shared governance does not lend itself to "orderly business practices" in institutional planning, budgeting, and facility development. Moreover, there is little communication among university administrators about good design and construction methods.

Modernizing academic research facilities on a national scale will require colleges and universities to adopt more efficient management practices, including state-of-the-art design and building methods. More efficient institutions will have a competitive edge no matter which modernization approaches are taken by Federal and state funding authorities. Improvements in design and management practices could also be communicated more effectively among institutions, enabling innovative approaches developed in one institution to be adapted to others.

I-2: Institutions should reinvestigate their funding sources and alternatives to assure themselves that available opportunities have been tapped to the fullest.

Comment: Most college and university administrations expend a great deal of time and effort keeping abreast of funding sources and programs. Nevertheless, each institution is urged to undertake a systematic and comprehensive examination of all its alternatives for research facility funding, with a view to expanding its "portfolio" of techniques, resources, and information sources.

Analysis of the advantages and disadvantages of various techniques as they apply to academic research equipment may be found in the June 1985 report entitled "Financing and Managing University Research Equipment", available without charge from the Association of American Universities, Suite 730, One Dupont Circle, Washington, D.C. 20036.

I-3: Institutions should design alternative approaches to indirect cost recovery; the Federal Government should encourage experiments with such approaches and evaluate them carefully.

Background: As discussed under action item F-1, better recovery of indirect costs is one approach that would permit institutions to finance facility modernization. In this context, a conference participant (Robert Sproull) proposed that standard cost recovery procedures be amended to use the concept of space rental for academic facilities.

In brief, institutions would be permitted to charge the equivalent of rent (per square foot of space used) for federally supported projects. The "basket" of costs covered by the rent would include depreciation, maintenance, security, grounds care, parking, and utilities associated with a particular facility. Rents charged by colleges and universities would also be based in part on, and could be compared with, market rents for facilities in an institution's vicinity. Other indirect cost items would be adjusted to some degree as institutions refine this idea and establish a new basis for cost pooling and recovery.

Comment: The Office of Management and Budget, granting agencies, and auditing agencies should work with groups of institutions to encourage this and other new approaches and to test them. Proponents believe that the concept of renting space associated with a project is more easily understood and more easily made comparable among institutions than are present methods of figuring and negotiating indirect costs. Many questions about the rental approach need to be resolved; these are set forth in Dr. Sproull's paper (included in Part III).

* * *

A final note on national recognition of the facilities modernization issue. Conference participants stressed that the scientific and engineering communities -- in academia, industry, and government -- must find more effective ways to communicate with the general public and with policy makers about the contributions of research advances to national goals and the relationship of modern productive facilities and equipment to making those advances.

CONFERENCE AGENDA

Monday, July 22, 1985

| | |
|---|---|
| 8:30 AM | Registration |
| 9:00 AM | Welcoming Remarks<br>Dale Corson, Chairman,<br>Government-University-Industry-<br>Research Roundtable |
| 9:15 AM | Overview, "The Search for Solutions"<br>Roland Schmitt, Chairman,<br>National Science Board |
| 9:45 AM | Concurrent Working Groups, Session I |
| 11:00 AM | Comprehensive Merit Evaluation and Research Facilities, Panel Discussion |
| | Moderator: Dale Corson<br>Panel Members:<br>Bernadine Healy, Deputy Director<br>Office of Science and Technology Policy |
| | Alvin Kwiram, Chairman<br>Department of Chemistry<br>University of Washington |
| | Peter Likins, President<br>Lehigh University |
| | Buddy MacKay, Member<br>U.S. House of Representatives |
| | Alvin Trivelpiece, Director<br>Office of Energy Research<br>Department of Energy |
| 12:30 PM | Lunch, NAS Refectory |
| 1:30 PM | Working Groups, Session II |
| 5:30 PM | Cocktail Reception, Great Hall |
| Evening | Complete Working Group reports as needed |

Tuesday, July 23, 1985

8:15 AM — Reports from Working Groups

Moderator: Dale Corson

8:15 AM - Reports
Working Group Moderators:
Edward Bloustein, David Clapp,
William Fassy, Kenneth Pikar,
Thomas Stelson, Robert Wise, William Wells

9:15 AM - Response to Working Group Reports, Panel Discussion
Panel Members:
The Honorable Don Fuqua, Member
U.S. House of Representatives

The Honorable George Darden, Member
U.S. House of Representatives

10:00 AM - Questions and Comments from the Audience

10:30 AM — Break

10:45 AM — Reports from Working Groups, continued

Moderator: Dale Corson

10:45 AM - Reports

11:15 AM - Questions and Comments from the Audience

12:00 PM — Observations, Conclusion, and Next Steps, Roland Schmitt, Bernadine Healy, and Dale Corson

1:00 PM — Adjourn

## WORKING GROUPS

1. Grants and Gifts (Federal, state, private sector; types, including matching, formula, block, set-asides, etc.)
   Moderator: Edward Bloustein, President
   Rutgers University

2. Alternative Sources of Finance (Loan guarantees, interest payments via grants, indirect cost recovery, borrowing, credit rating improvements, tax incentives, etc.)
   Moderators: David Clapp, Partner
   Goldman Sachs and Company

   William Massy, Vice President for
   Business and Finance
   Stanford University

3. Partnerships (Forms and types; possible cooperative arrangements, including inter-corporate, government-industry-foundation, inter-university; combinations with borrowing, grants, etc.)
   Moderator: Kenneth Pickar
   Research and Development Manager
   Electronics Laboratories
   General Electric Company

4. University Policies and Practices (Facility design; causes of obsolescence; depreciation obsolescence practices; maintenance, refurbishment v. replacement; restraint; etc.)
   Moderator: Thomas Stelson
   Vice President for Research
   Georgia Institute of Technology

5. Role of the States (Direct support; financial packages; debt; tuition charges; relations with private universities; economic development centers; etc.)
   Moderator: Robert Wise
   Assistant for Policy and Planning
   Office of the Governor
   State of Arizona

6. Comprehensive Merit Evaluation for Facilities (Present practice; alternatives; confidence-building measures; differentiation from individual research grants; etc.)
   Moderator: William Wells, Professor
   Department of Management Science
   George Washington University

Planning Group
Working Conference on Strategies for Supporting
Academic Research Facilities

Dr. John H. Moore, Chairman
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